REMARKS

Present Status of the Application

The Office Action mailed September 3, 2003 rejected all presently pending claims 1-10. Specifically, claims 1 and 10 were rejected under 35 U.S.C. 102(b) as being anticipated by Snow (US 5,805,326). Claim 2 was rejected under 35 U.S.C. 103(a) as being unpatentable over Snow in view of Yang (US 6,358,392). Claims 3-9 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kimock (US 5,844,225) in view of Snow. In response thereto, Applicants have amended claims 1-4 and 7. Reconsideration of claims 1-10 is respectfully requested.

Discussions of the Amendments

Applicants have amended the "metallic bismuth film" in original claims 1-4 and 7 as "pure bismuth film" to clearly distinguish it from Snow's organo-bismuth complex film. The organo-bismuth complex film will be explained later.

The pure bismuth film is ***not a new matter***, since it is clearly described in paragraph **[0011]** of the specification that the bismuth film is formed ***with only a bismuth target of 99.9997% purity***. Therefore, the bismuth film of this invention is a pure bismuth film.

Discussion of Office Action Rejections under 35 U.S.C. 102(b)

Claims 1 and 10 were rejected under 35 U.S.C. 102(b) as being anticipated by Snow. Please note that Applicants have amended independent claim 1.

This invention features with a non-linear optical material that comprises a ***pure*** bismuth film that is sufficiently thin for producing non-linear refraction and non-linear absorption. The feature is recited in amended independent claim 1, marked by underlines:

> *1. (Currently Amended) A non-linear optical material comprising a pure bismuth film that is sufficiently thin for producing non-linear refraction and non-linear absorption.*

Snow fails to teach or suggest ***using a pure bismuth film as a non-linear optical material***. As described in claim 1, Snow does disclose a heavy metal limiter material selected from the group consisting of substituted and unsubstituted heavy metal phthalocyanines, heavy metal naphthalocyanines, heavy metal porphyrins, salts of any of the above and mixtures thereof, wherein the heavy metal includes bismuth. It is obvious that Snow teaches an ***organo-bismuth complex film*** as a non-linear optical material, but not a ***pure bismuth film***. In fact, the organo-bismuth complex is a ***non-metallic*** compound, and therefore it is **not** obvious to relate its properties to those of pure (***metallic***) bismuth.

Moreover, the pure bismuth film used as a ***non-linear optical material*** is also not taught in Yang and Kimock. In Yang, the bismuth film is used as a ***magnetoresistive material*** (col. 2, line 66-col. 3, line 1); while in Kimock, the bismuth film serves as a ***binding layer*** between the first interlayer 2 and the low friction diamond-like carbon layer 3, as described in col. 9, lines 28-34 and lines 39-44.

For at least the reasons mentioned above, Applicants respectfully submit that the amended independent claim 1 patently defines over the prior art.

For at least the same reasons mentioned above, Applicants respectfully submit that claim 10 dependent from the amended independent claim 1 also patently defines over the prior art.

Discussion of Office Action Rejections under 35 U.S.C. 103(a)

Rejection of Claim 2

Claim 2 was rejected under 35 U.S.C. 103(a) as being unpatentable over Snow in view of Yang. Please note that Applicants have amended claim 2.

As mentioned above, Snow and Yang ***both*** fail to teach or suggest using a pure bismuth film as a non-linear optical material. Applicants also notice that the bismuth film in Yang is actually formed with ***an electrochemical or electroplating process***, as described in col. 3, lines 55-59, but ***not with a laser deposition process as indicated by Examiner. It is the metallic underlayer that is formed with laser deposition***, as described in col. 4, lines 7-13: "... *before a bismuth thin film is formed on a substrate made of an insulating material such as silicon, a boundary layer in the form of a thin metallic underlayer is preferably laid over the substrate. The metallic underlayer can be formed by using any known thin film deposition method such as sputtering, evaporation, laser ablation, etc.*" Therefore, at least the above two features of claim 2 cannot be obtained by combining Snow and Yang.

For at least the reasons mentioned above, Applicants respectfully submit that claim 2 patently defines over the prior art.

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Rejection of Claims 3-9

Claims 3-9 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kimock in view of Snow. Please note that Applicants have amended claims 3-4 and 7.

As mentioned above, Kimock discloses a bismuth film used as a ***binding layer*** between two layers, while Snow discloses an organo-bismuth complex film as a ***non-linear optical material***. Since ***the application fields of Kimock and Snow are quite different***, it is not obvious for one of ordinary skill to combine the two Patents.

Moreover, even though the two Patents are combined intentionally, the feature of claim 1 (a pure bismuth film used as a non-linear optical material) is still not obvious to one of ordinary skill. The reason is that ***the chemical structures, the chemical properties and the usage*** of the bismuth film of Kimock are so different from those of the organo-bismuth complex film of Snow that ***one of ordinary skill is not motivated to uses the bismuth film to replace the organo-bismuth complex film as a non-linear optical material.*** For example, the bismuth atoms in a pure bismuth film are connected to each other with metal-metal bonds, while each bismuth atom in an organo-bismuth complex film is isolated by several ligands. Therefore, when Kimock is taken as the major cited document, it is not obvious that the bismuth film can have the non-linear optical properties of the organo-bismuth complex film of Snow. Similarly, when Snow is taken as the major cited document, it is also not obvious that the non-linear optical effects of the organo-bismuth complex film can be provided by a bismuth film that merely serves as a binder layer in Kimcock. That is, ***the aforementioned feature of independent claim 1 is non-obvious over Kimock in view of Snow, or over Snow in view of Kimock.***

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For at least the reasons mentioned above, Applicant respectfully submit that claims 3-9 dependent from claim 1 also patently define over the prior art.

CONCLUSION

For at least the forgoing reasons, it is believed that all pending claims 1-10 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted,
J.C. PATENTS

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Jiawei Huang
Registration No. 43,330

4 Venture, Suite 250
Irvine, CA 92618
Tel.: (949) 660-0761
Fax: (949) 660-0809